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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/542,783	04/04/2000	John Whitman	4294US(98-1208)	6870

7590 12/01/2004

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EXAMINER

KEBEDE, BROOK

ART UNIT	PAPER NUMBER
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2823

DATE MAILED: 12/01/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/542,783	Applicant(s) WHITMAN ET AL.	
	Examiner Brook Kebede	Art Unit 2823	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 05 November 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-87 is/are pending in the application.
- 4a) Of the above claim(s) 18-87 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>11/5/04</u> | 6) <input type="checkbox"/> Other: |

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on November 5, 2004 has been entered.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

3. Claims 1, 2, 8, 9, 11, 16 and 17 are rejected under 35 U.S.C. 102(e) as being anticipated by Kikuchi et al. (US/6,278,153).

Re claim 1, Kikuchi et al. disclose a method for disposing a material on a semiconductor device structure comprising: providing a semiconductor device structure (see Fig. 6D) including a surface (23 24 25 26) and at least one recess (23a) formed in the surface; disposing the material (20) on the surface (23 24 25 26) so as to substantially fill at least one recess (23a) and the material (20) covering the surface having a thickness less than a depth of said at least one recess (23a) without subsequently removing the material (20) from the surface, an upper surface

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of at least a portion of said material (20) over or within said at least one recess being substantially planar (23 24 25 26) (see Figs. 6A-6D; 10A-10E and 13A-13E;).

Re claim 2, as applied to claim 1 above, Kikuchi et al. disclose all the claimed limitations including disposing the material so as to substantially fill the at least one recess without substantially covering said surface (see Figs. 6A-6D; 10A-10E and 13A-13E;).

Re claim 8, as applied to claim 1 above, Kikuchi et al. disclose all the claimed limitations including upon exposing the material disposed over an entirety of said semiconductor device structure to an etchant, the material covering said surface is substantially removed therefrom, while the material located in said at least one recess substantially fills said at least one recess (see Figs. 6A-6D; 10A-10E and 13A-13E).

Re claim 9, as applied to claim 1 above, Kikuchi et al. disclose all the claimed limitations including the limitation wherein said providing said semiconductor device structure comprises providing a stacked capacitor structure with said at least one recess comprising at least one container formed in an insulator layer of said stacked capacitor structure, said surface and said at least one container being lined with a conductive material (see Figs. 6A-6D; 10A-10E; 13A-13E)

Re claim 11 as applied to claim 1 above, Kikuchi et al. disclose all the claimed limitations including the limitation wherein said disposing the material comprises disposing a mask material over said semiconductor device structure (see Fig. 6A-6D; 10A-10E; 13A-13E).

Re claims 16 and 17, as applied to claim 1 above, Kikuchi et al. disclose all the claimed limitations including the limitation providing a semiconductor device structure having a surface with at least one dual damascene trench recessed therein and a layer of conductive material, with a non-planar surface disposed in said at least one dual damascene trench add at least partially covering said surface and disposing a stress buffer over said layer of conductive material, said

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stress buffer having a substantially planar surface without removing material thereof following said disposing (see Figs. 14A-14D).

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

5. Claims 3-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kikuchi et al. (US/6,278,153) in view of Yoshihara (US/6,117,486).

Re claims 3-7, as applied to claim 1 above, Kikuchi et al. disclose all the claimed limitations including the limitation applying the material to the surface of the semiconductor device structure spinning the semiconductor device structure (see Kikuchi et al. Figs. 6A-6D; 10A-10E and 13A-13E). However, Kikuchi et al. do not disclose decreasing a rate of the spinning while permitting the material to at least partially cure and gradually increasing the rate of the spinning.

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Yoshihara discloses applying the material to the surface of the semiconductor device structure spinning the semiconductor device structure both decreasing rate of spinning and while allowing the material to cure gradually increasing the rate of spinning; exposing the material to a soft balling temperature ; spinning rate of 1000 and 100 rpm (see Figs. 10 and Col. 13, lines 25-44). As Yoshihara discloses the method provided forming of resist film on the semiconductor wafer at predetermined and uniform thickness.

Therefore, it would have been obvious to one having ordinary skill in the art at the time of applicant(s) claimed invention was made to have provided Kikuchi et al. reference with spinning the semiconductor device structure both decreasing rate of spinning and while allowing the material to cure gradually increasing the rate of spinning as taught by Yoshihara because the method would have provided to form a resist film on the semiconductor wafer at predetermined and uniform thickness.

6. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kikuchi et al. (US/6,278,153) in view of Lin et al. (US/6,046,083).

Re claim 10, as applied to claim 9 above, Kikuchi et al. disclose all the claimed limitations including forming of stacked capacitor structure having conductive layer. Although it is well-known in the art Kikuchi et al. do not disclose doped HSG.

Lin et al. disclose providing said semiconductor device structure having a stacked capacitor structure with the surface and at least one container being lined, with doped hemispherical grain polysilicon (see Figs. 7 and 8).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of applicant(s) claimed invention was made to have provided Kikuchi et al. reference with doped

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HSG as taught by Lin et al. because the device performance would have been enhanced (see Lin et al. Col. 1, lines 59-67 through Col. 2, lines 1-14).

7. Claims 12-15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kikuchi et al. (US/6,278,153) in view of Park et al. (US/6,326,282).

Re claim 12, as applied to claim 1 above, Kikuchi et al. disclose all the claimed limitations including the limitation except providing a shallow trench isolation structure with at least one recess comprising at least one trench formed in a surface of the shallow trench isolation structure.

Park et al. disclose forming of a shallow trench isolation structure with at least one recess comprising at least one trench formed in a surface of the shallow trench isolation structure in order to form an isolation region between the device elements (see Figs. 2B-2E).

Therefore, it would have been obvious to one having ordinary skill in the art at the time of applicant(s) claimed invention was made to have provided Kikuchi et al. reference with shallow trench isolation structure as taught by Park et al. because the shallow trench isolation structure would have provided isolation region between device elements in the substrate.

Re claim 13, as applied to claim 12 above, both Kikuchi et al. and Park et al. in combination disclose all the claimed limitations including the limitation wherein said disposing the material comprises disposing a mask material over said shallow trench isolation structure (see Park et al. Figs. 2B-2E).

Re claim 14, as applied to claim 12 above, both Kikuchi et al. and Park et al. in combination disclose all the claimed limitations including the limitation wherein said providing said shallow trench isolation structure comprises providing said shallow trench isolation

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structure with an insulator layer substantially filling said at least one trench and covering said surface see Park et al. Figs. 2B-2E).

Re claim 15, as applied to claim 14 above, both Kikuchi et al. and Park et al. in combination disclose all the claimed limitations including the limitation wherein said disposing the material comprises disposing a stress buffer over said insulator layer, said stress buffer having a substantially planar surface without removing material thereof following said disposing see Park et al. Figs. 2B-2E).

Conclusion

8. **THIS ACTION IS MADE NON-FINAL.**

Correspondence

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brook Kebede whose telephone number is (571) 272-1862. The examiner can normally be reached on 8-5 Monday to Friday.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on (571) 272-1855. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872-9306 for regular communications and (703) 872-9306 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (571) 272-1950.

Brook Kebede
Examiner
Art Unit 2823



BK
November 26, 2004